UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,999	10/23/2003	Robert R. Rice	000404-804	9334

7590   09/11/2006

Connie M. Thousand
Northrop Grumman Space & Mission Systems Corp.
One Space Park, Bldg. El/2041
Redondo Beach, CA 90278

EXAMINER
ALLISON, ANDRAE S

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/692,999	RICE ET AL.
	Examiner	Art Unit	
	Andrae S. Allison	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>October 23, 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>*1-11*</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*1-11*</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>23 October 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date <u>October 23, 2003;</u>. March 25, 2005

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Specification

1.   The disclosure is objected to because of the following informalities: The phrase

"sport of interest" should be read "spot of interest" because the word "sport" should be

replaced with "spot".

2.   The disclosure is objected to because it contains an embedded hyperlink and/or

other form of browser-executable code on page 6, [p][16]. Applicant is required to delete

the embedded hyperlink and/or other form of browser-executable code. See MPEP §

608.01.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   Claims 1-3, 5, 6, 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Black et al (US Patent No.: 5,774, 591) in view of Pantic (NPL

document titled "Expert system for automatic analysis of facial expression") further in

view of Vining et al (US Patent No.: 6,785,410).

As to claim 1, Black discloses a method for sensing selected emotions (e.g.

happiness; column 10, line 64) in a human subject (human face; column 4, line 26).

Black teaches generating an image of substantially all of the face of a human subject

(40, Fig 2). Black also teaches processing the image to identify movements (determine

image motion, column 7, line 34) in selected critical areas of the face (e.g. eye regions; column 7, line 35). Black also teaches comparing the identified movements in the selected critical areas with a database (temporal models stored on memory 28, see Fig1) that associates movements in selected critical areas with specific emotional (e.g. anger expression can be characterized by an initial flattening of the lip followed by a long downward curvature, followed by the mouth going back to a relax position; column 20, lines 36-40) and physical conditions.

However, Black does not teach associating movement in critical areas with physical conditions. Pantic teaches a method of analyzing non-verbal communication (page 881, [p][3], lines 4-5). Pantic also teaches associating movement in critical areas (specific facial actions; page 881, [p][3], line 10) with physical conditions (physiological reaction, page 881, [p][3], line 13). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method of analyzing non-verbal communication of Pantic to the method of recognizing facial expression of Black for vision based gesture analysis which includes face action recognition and emotional classification of facial expressions (page 903, [p][3], lines 2-5).

Note the discussion above, both Black and Pantic does not teach generating a report of the emotional and physical condition of the subject. Vining teaches a method of reporting findings (column 2, line 11-12) of an expert analysis of image data that includes the step of generating a report (column 3, line 37-38) of the emotional and physical condition of the subject. Therefore it would have been obvious to one of

ordinary skill in the art at the time the invention was made to have added the method of

reporting findings of Vining to the method of recognizing facial expression of Black as

modified by Pantic for creating a report from a database of expert findings so that "data

mining and other analysis may be conducted" (column 3, lines 39-46).

As to claim 2, Black teaches wherein the processing step comprises

inputting a two-dimensional frame of the image (column 7, line 47). Black teaches

scanning the image to locate the subject's face and determine it's relative position and

extent (column 7, line 59). Black also teaches scanning the facial part of the image to

detect the selected critical areas (column 7, line 59). Black further teaches repeating the

preceding steps for a sequence of image frames (column 8, lines 41-45). Additionally,

Black teaches recording frame-to-frame changes (recover motion parameters; column

8, line 56) in critical areas of interest. Black further teaches recording frame-to-frame

changes in critical area positions for purposes of tracking the positions while permitting

limited movement of the subject (column 8, lines 59-60).

As to claim 3, Black teaches a method wherein the step of recording frame-to-

frame changes in critical areas of interest includes recording changes in spot area (see

column 9, line 33-43 where motion of spot area such as brow regions 45, see Fig 2, are

recovered and stored in memory 20).

As to claim 5, note the discussion above, Pantic teaches wherein the comparing

step makes use of a database that uses the facial action coding system (FACS) (page

901, [p][1] lines 6-7).

As to claim 6, Black teaches an apparatus for sensing selected emotions (facial

gesture and recognition system; column 6, line 68 and column 7, line 1) in a human

subject. Black also teaches optical imaging device (see column 7, line 44 where image

acquisition system 8, see Fig 1, includes a camera) for generating an image of

substantially all of the face of a human subject. Black further teaches an image

processing module (16, see Fig 1) for processing the image to identify movements in

selected critical areas of the face; a database (temporal models are stored in memory

28) associates groups of facial movements with specific emotional (e.g. anger

expression can be characterized by an initial flattening of the lip followed by a long

downward curvature, followed by the mouth going back to a relax position; column 20,

lines 36-40) and physical conditions of the subject;

However, Black does not teach associating movement in critical areas with

physical conditions. Pantic teaches a system for analyzing non-verbal communication

(page 881, [p][3], lines 4-5). Pantic also teaches associating movement in critical areas

(specific facial actions; page 881, [p][3], line 10) with physical conditions (physiological

reaction, page 881, [p][3], line 13). Therefore it would have been obvious to one of

ordinary skill in the art at the time the invention was made to have added the system of

analyzing non-verbal communication of Pantic to the facial gesture and gesture

recognition system of Black for vision based gesture analysis which includes face action

recognition and emotional classification of facial expressions (page 903, [p][3], lines 2-5).

Black further teaches a database analysis module (26, feature and gesture recognition detector; see Fig 1) for comparing the identified movements in the selected critical areas with the database.

Note the discussion both Black and Pantic does not teach a report generator, for generating a report of the emotional and physical condition of the subject. Vining teaches a system for reporting findings (column 2, line 11-12) of an expert analysis of image data that includes a report generator (10, reporting system, see Fig 2) for generating a report of the emotional and physical condition of the subject. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the system for reporting findings of Vining to the recognizing facial expression system of Black as modified by Pantic for creating a report from a database of expert findings so that "data mining and other analysis may be conducted" (column 3, lines 39-46).

As to claim 8, Black teaches wherein the image processing modules comprises: the means for inputting a two-dimensional frame of the image is image acquisition system 8, see Fig 1.

the means for scanning the image to locate the subject's face and determine it's relative position and extent is image segmentation 12, see Fig1.

the means for scanning the facial part of the image to detect the critical areas of interest is image segmentation 12, see Fig1.

the means for repeating the preceding steps for a sequence of image frames is motion

estimation system 16, see Fig1.

the means for recording frame-to-frame changes in the critical areas of interest is

motion estimation system 16, see Fig1.

the means for recording frame-to-frame changes in critical area positions, for purposes

of tracking the positions while permitting limited movement of the subject is region

tracking system, 18, see Fig 1.

As to claim 9, Black teaches an apparatus wherein the means for recording

frame-to-frame changes in the critical areas includes means for recording changes in

area (see column 9, line 33-43 where motion of spot area such as brow regions 45, see

Fig 2, are recovered and stored in memory 20).

As to claim 11, note the discussion above, Pantic teaches wherein the database uses

the facial action coding system (FACS) (page 901, [p][1] lines 6-7).

4.   Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Black et al (US Patent No.: 5,774, 591) in view of Pantic (NPL document titled "Expert

system for automatic analysis of facial expression") further in view of Vining et al (US

Patent No.: 6,785,410) further in view of Lee et al (US Patent No. 7,095,901).

As to claim 4, neither Black, Pantic nor Vining teach a method wherein the step

of recording frame-to-frame changes in critical areas of interest includes recording

changes in axial distance to facilitate detection of axial pulsing movements. Lee teaches

a method of obtaining iris images (column 4, line 61) including the step of recording

changes in axial distance (measuring the distance between a user's face and a camera;

column 8, line 10-11) to facilitate detection of axial pulsing movements. Therefore it

would have been obvious to one of ordinary skill in the art at the time the invention was

made to have added the method of obtaining iris images of Lee to the method of

recognizing facial expression of Black as modified by Pantic and Vining for measuring

the distance between a user and a "camera more accurately, more conveniently and

more quickly and to focus the camera automatically" (column 4, lines 2-4).

As to claim 10, neither Black, Pantic nor Vining teach an apparatus wherein the

optical imaging device includes means for measuring axial distance to a critical area of

the face; and the means for recording frame-to-frame changes in critical area positions

includes means for recording changes in axial distance, to facilitate detection of axial

pulsing movements in a critical area. Lee teaches an apparatus for obtaining iris

images (column 4, line 61) including means for measuring axial distance to a critical

area of the face (703, distance measurer; Fig 12) and the means for recording frame-to-

frame changes in critical area positions includes the means for recording changes in

axial distance (703, distance measurer; Fig 12) , to facilitate detection of axial pulsing

movements in a critical area. Therefore it would have been obvious to one of ordinary

skill in the art at the time the invention was made to have added the apparatus for

obtaining iris images of Lee to the facial gesture and gesture recognition system of Black as modified by Pantic and Vining for measuring the distance between a user and a "camera more accurately, more conveniently and more quickly and to focus the camera automatically" (column 4, lines 2-4).

5.   Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent No.: 5,774, 591) in view of Pantic (NPL document titled "Expert system for automatic analysis of facial expression") further in view of Vining et al (US Patent No.: 6,785,410) further in view of Yamamoto (US Patent No.: 6,549,664).

As to claim 7, note the discussion, neither Black, Pantic nor Vining teach an apparatus wherein the optical imaging device comprises a charged-coupled device (CCD) camera producing a two-dimensional image. Yamamoto teaches a face-image processing apparatus (column 3, line 25) that comprises a charged-coupled device (CCD) camera (see Fig. 2) producing a two-dimensional image. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the optical image device of Black as modified by Pantic and Vining with the face-image processing apparatus of Yamamoto for photographing of a person's face used for extracting a certain characteristic such as an eye or nostril (column 3, lines 29-35).

Conclusion

The prior art made part of the record and not relied upon is considered pertinent

to applicant's disclosure.

Endrikhovski et al (US Patent No.: 7,003,139) is cited to teach a method for

determining affective information for at lease one image.

Tian et al (US Patent No.: 6,459,806) is cited to teach a method for automatic

detection of neutral expression in digital images and video.

Black et al (NPL Document "Recognizing Facial Expressions in Image Sequence

Using Local Parameterized Models of Image Motion") is cited to teach a method of

recovering and recognizing rigid and articulated motion of human faces.

Yaser et al (NPL Document "Recognizing Human Facial Expressions From Long

Image Sequence Using Optical Flow") is cited to teach an approach to the analysis and

representation of facial dynamics for facial expression recognition an from image

sequence.

Inquiries

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Andrae S. Allison whose telephone number is (571)

270-1052. The examiner can normally be reached on Monday-Friday, 8:00 am - 5:00

pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chanh D. Nguyen can be reached on (571) 272-7772. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrae Allison

August 31, 2006

A.A

CHANH D. NGUYEN
SUPERVISORY PATENT EXAMINER